(No Model.) 2 Sheets—Sheet 1.

J. T. SMITH.

CLEANER AND REDUCER FOR CRUDE FLAX STRAW.

No. 505,069. Patented Sept. 12, 1893.

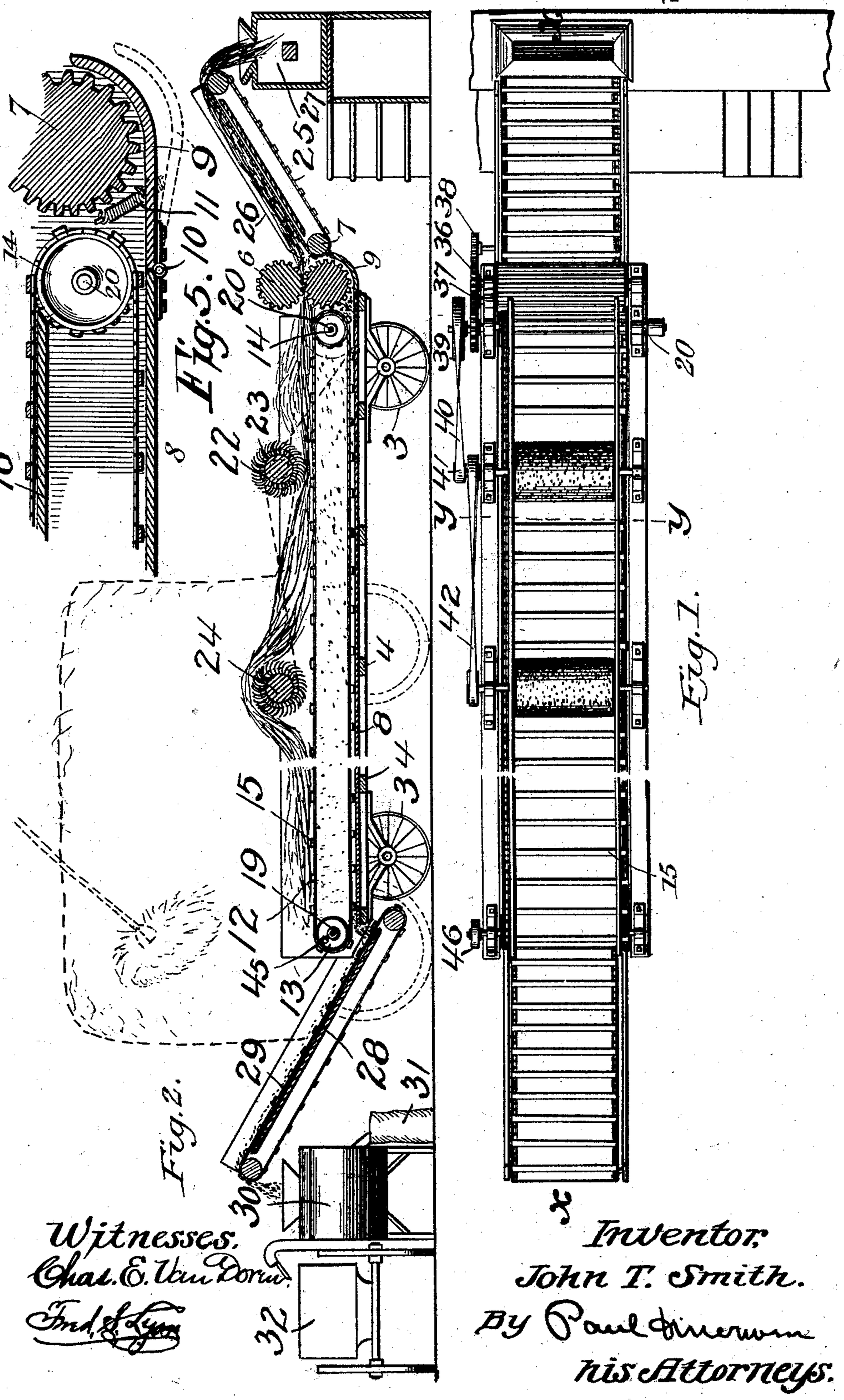

Fig. 1.

Fig. 2.

Witnesses.
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Fred. C. Lyon.

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(No Model.) 2 Sheets—Sheet 2.

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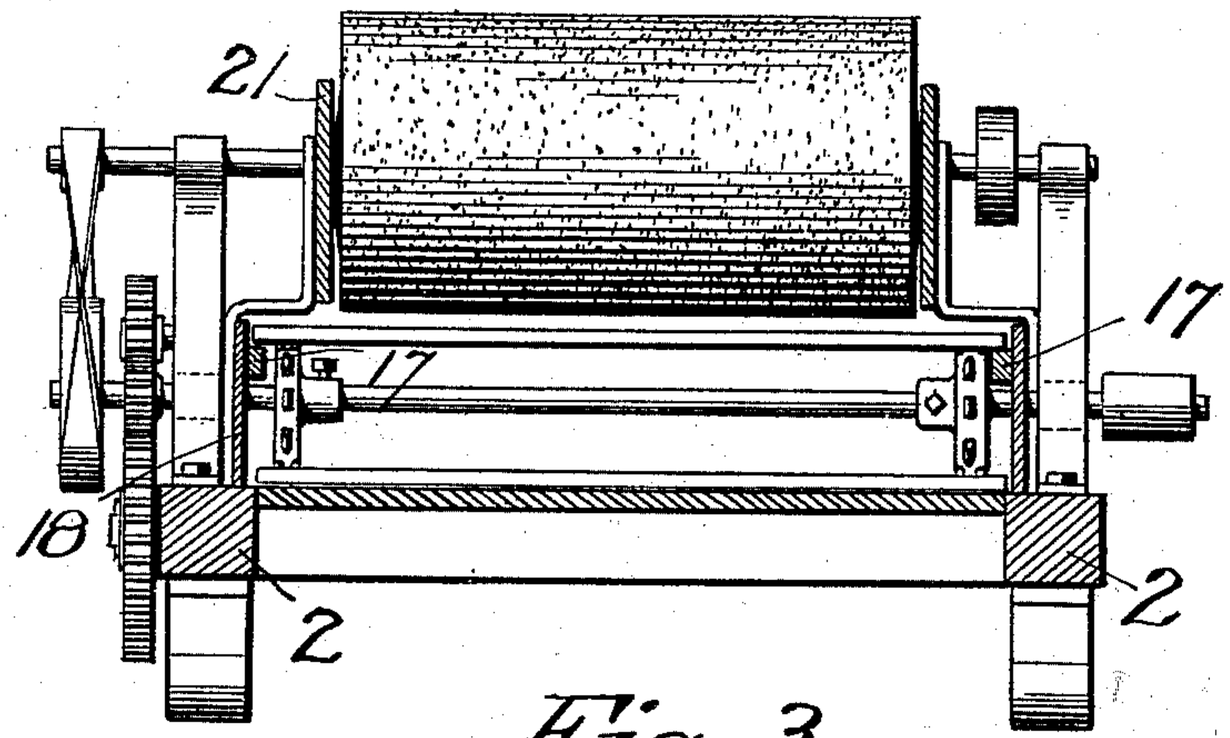

Fig. 3.

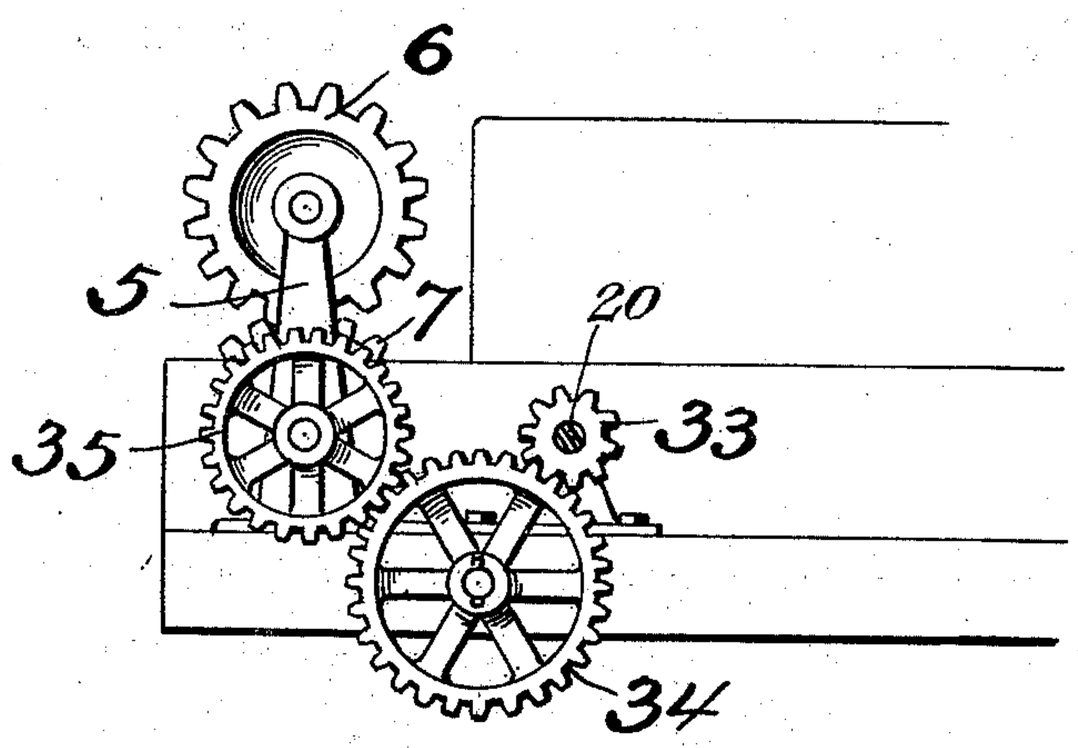

Fig. 4.

Witnesses,
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UNITED STATES PATENT OFFICE.

JOHN T. SMITH, OF HERON LAKE, MINNESOTA.

CLEANER AND REDUCER FOR CRUDE FLAX-STRAW.

SPECIFICATION forming part of Letters Patent No. 505,069, dated September 12, 1893.

Application filed December 2, 1892. Serial No. 453,861. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. SMITH, of Heron Lake, Jackson county, State of Minnesota, have invented certain Improvements in Cleaners and Reducers for Crude Flax-Straw, of which the following is a specification.

This invention relates to a field machine for use in separating fine shives and broken straw from the flax as it comes from the thrasher; and further for breaking the flax straw to separate the woody portions or shives from the fiber, the result of the operation of the machine being a coarse tow which may be used in this unfinished state or may be further reduced and finished to make the several grades known to the trade.

The object of the invention is to provide a machine which will handle the rough stock very rapidly and will effectually shake out from the long straw all of the short broken straw, dirt and woody portions, and especially to provide a machine upon which the stock may be thrown directly from the farmer's wagon; and which in addition to shaking out the above waste parts will break the long straw to detach the shives or woody portions of the straw from the flexible fiber thereof.

To this end the invention consists in general in the constructions and combinations all as hereinafter described and particularly pointed out in the claims, and will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a longitudinal vertical section thereof on the line *x—x* of Fig. 1, showing also means for separating the loose flax-seed which may remain in the straw after thrashing. Fig. 3 is an enlarged detailed cross section on the line *y—y* of Fig. 1. Fig. 4 is an enlarged detail showing the means for driving the conveyer and the reduction rolls. Fig. 5 is a detail showing the front end of the conveyer with the floors beneath the upper and lower parts thereof, and also the hinged part provided beneath the lower break roll.

As shown in the drawings, 2—2 represent long sills or beams which are supported upon the strong low wheels 3. Suitable cross beams 4 serve to make a rigid frame and upon the upper sides of the sill I arrange suitable bearing blocks 5 for the corrugated break rolls 6 and 7. The machine is provided with the continuous bottom or floor 8, which at its forward end is provided with the curved extension 9 attached thereto by hinges 10 and extending about one-half way up on the forward side of the lower break roll. Springs 11 are provided at opposite sides of the hinged board and normally support the same and allow the board to yield when an amount of straw becomes wound about the break roll, as occasionally happens. Above the floor 8 I provide the wide and long conveyer composed of the endless chains 12 operating over sprockets 13 and 14 at the rear and forward ends respectively, and connected by cross slats 15 on the lower side of the conveyer. These cross slats operate along the floor 8 while the upper side is supported either by the second floor 16 (see Fig. 5) or by cleats 17 provided on the sideboards 18 and upon which the outer ends of the slats rest. See Fig. 3. The sprocket wheels are provided upon the shafts 19 and 20 respectively, which extend through bearings resting upon the sills and are driven in a manner which will be hereinafter described. Above the conveyer at each side thereof I provide other sideboards 21 over the ends of said slats and within which the flax straw is confined. These sideboards run close up to the break rolls to direct the straw into the same. At a point about six feet back of the break rolls I provide a duffer or beater 22, consisting of a large wooden roll provided with a large number of the curved spikes or fingers 23; and at a point from six to ten feet back of this duffer I arrange a similar device 24 arranged to operate in an opposite direction, however. Between the duffer 24 and the rear end of the machine is a very large space upon which the crude straw is pitched directly from the wagon as indicated in dotted lines in Fig. 2. In front of the break rolls I provide an inclined conveyer 25 operating in a trough 26 and adapted to carry the cleaned and reduced fiber upward into the baling press 27, which may be of any desired construction. Projecting beneath the rear end of the floor 8 is an inclined conveyer 28 operating in a trough 29 and adapted to carry the shives, broken straw, &c., upward and drop the same into the fanning mill 30, where all of the flax seed which

may remain in the straw as it comes from the thrasher is separated from the shives, the seed being passed into a bag 31 while the shives are elevated and discharged either into a bin or into a wagon 32 driven beneath the spout. The shaft 20 is the power shaft in the machine and is driven by any suitable means. Upon the outer end of this shaft is a small pinion gear 33, which meshes with an idler gear 34, which in turn engages the gear wheel 35 arranged upon the shaft of the lower break roll. The upper break roll is driven by the lower one. The conveyer 25 is driven by the sprocket belt 36 passing over sprocket wheels 37 and 38 upon the shaft of the lower break roll and the shaft of the conveyor respectively. The duffer 22 is driven from a large pulley 39 upon the shaft 20 from whence a crossed belt 40 extends over a pulley 41 on the duffer shaft. A second twisted belt 42 extends between pulleys upon the shafts of the two duffers that reverses the operation of the duffer 24 with respect to that number 23. When it is desired to run the conveyer 28, the sprockets 13 are made fast upon the shaft 19 by set screws 45 and the lower shaft of the conveyer connected by a cross-belt with the pulley 46 on the shaft 19.

The operation of the machine is as follows: The loose straw being thrown upon the rear end of the conveyer a large amount of waste, such as dirt, shives, broken straw, &c., is sifted through the slats of the upper part of the long conveyer and drops upon the floor 8. The stock being carried along by the conveyer 12 is taken up by the duffer 24 which raises the same and throws it down forcibly upon the middle part of the conveyer, thus loosening the stock and shaking out a considerable quantity of waste. From thence the straw is passed along to the duffer 22, which again loosens the bunches of straw to shake out remaining waste parts, and throws the same forward quite to the break rolls, which rolls rapidly draw off the straw from the conveyer and by cramping it effectually breaks up the woody portions or shives of the straw without breaking the long fiber. These shives drop down in front of the lower roll and being guided by the curved board 9 are carried back by the lower side of the roll into position to be taken up by the returning lower slats of the long conveyer, which carries all of the shives and waste parts back to the rear end of the floor, from whence they drop back upon the conveyer 28 and are carried to the fanning mill or to a waste dump. The stock passed from the break rolls to the conveyer 25 is quite free from shives and may be baled for shipment to a factory where the finishing of the flax fiber is completed. I thus provide a cheap and very efficient machine which possesses the following advantages: It requires no extra help to feed it as the straw is thrown directly upon the long conveyer by the farmers from whom the straw is purchased; second, all of the dirt and other impurities which are contained in the straw as it comes from the thrasher are taken out and with it a large quantity of the woody portions of the flax straw, thus dispensing with the extra weight of material to be shipped and greatly reducing the cost of transportation; third, the product of the machine may be baled without fear of breaking the fiber which would in many cases result if the attempt was made to bale the unreduced straw; fourth, the machine taken as a whole may be drawn from one part of the country to another, thus making unnecessary the establishment of separate reducing factories and the heavy expense attendant upon furnishing separate machines therefor. It is understood that these machines are worked merely as tributary to a main reducing and finishing factory located in most cases at a considerable distance.

When the machine is used for reducing hemp the fanning mill is disconnected, and when considerable seed is to be thrashed from the straw the second floor 16 is pushed into place. This holds the seed pods which are broken by the moving slats and finally swept over the forward end of the floor.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with the long conveyer, of a trough wherein the same is contained, over the floor of which the lower side of said conveyer is adapted to operate, break rolls arranged to receive the stock from said long conveyer, and a conveyer to receive the reduced stock from said break rolls, substantially as described.

2. The combination with the long conveyer composed of endless chains and cross slats, the floor arranged beneath the lower side of said conveyer, break rolls to receive the stock from said conveyer, said floor extending beneath said break rolls, separate conveyers for carrying away the reduced stock and the shives respectively, and means for driving all of said parts, substantially as described.

3. The combination with the sills, of the long conveyer mounted thereon, the floor 8 arranged beneath said conveyer, means for supporting the slats on the upper side of the conveyer, sideboards for said conveyer, the break rolls, and the duffer arranged above said conveyer and arranged to throw the stock toward the rolls, substantially as described.

4. The combination with the sills, of the floor 8, the conveyer arranged to operate above said floor, the top of said conveyer being open, sideboards for the conveyer, the break rolls, said floor extending beneath said break rolls, and the duffers 22 and 24 arranged to operate above said conveyer and a considerable distance from one another and from the break rolls, substantially as described and for the purpose specified.

5. The combination with the trough, having the floor 8, of a conveyer arranged to op-

erate over said floor and having an open top, the break rolls, said floor extending beneath said break rolls, sideboards arranged above said conveyer, and duffers or beaters 22 and 24 operating in opposite directions, said duffers being adapted to raise the stock from said conveyer whereby upon its again falling upon the conveyer, the waste portions are taken out through said conveyer and upon said floor to be carried back by the lower side of the conveyer, substantially as described.

6. The combination with the long conveyer, of break rolls, the floor 8 over which said conveyer is adapted to operate, the hinged extension of said floor, said extension being curved upward beneath the forward side of the lower roll, and a spring for normally supporting said extension, substantially as described.

7. The combination with the frame, of the wheels 3 wherein the same is mounted, the floor 8, with a long conveyer arranged to operate above said floor and the endless chains and cross slats, means for supporting the upper side of the conveyer, the break rolls, a duffer or duffers arranged to operate above said conveyer at a considerable distance from said break rolls, a conveyer 25 to receive the stock from said rolls, and a waste conveyer 28 to receive the waste from the rear end of said floor 8, substantially as described.

8. In a field machine for treating crude flax straw the combination of a wheeled frame provided with the floor 8, of the long conveyer 12 composed of chains and cross slats, ribs whereon the outer edges of said slats are supported, side-boards for the conveyer, break rolls to receive the stock therefrom, a hinged extension 9 of said floor, the oppositely rotating duffers 22 and 24 separated by considerable distance from one another and from said rolls, a fiber conveyer 25, and a waste conveyer 28, substantially as described.

In testimony whereof I have hereunto set my hand this 15th day of November, 1892..

JOHN T. SMITH.

In presence of—
CHAS. CALLENDER,
M. A. HOUSON.